

## PATENT ABSTRACTS OF JAPAN

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(30)Priority

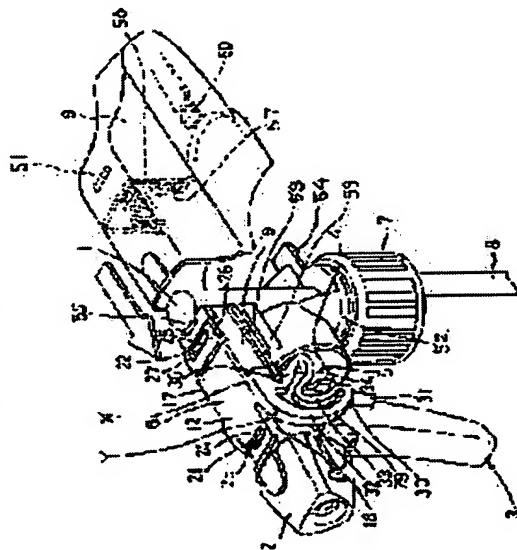
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**(54) RESET SPRING MADE OF SYNTHETIC RESIN IN TRIGGER TYPE LIQUID JETTING APPARATUS**

(57)Abstract:

**PROBLEM TO BE SOLVED:** To simplify a spring and give a soft and good stiffness touch of operation by using a leaf spring made of a synthetic resin with high strength.

**SOLUTION:** In a trigger type liquid jetting apparatus comprising a nozzle 2 installed in the tip end of a jetting apparatus main body 1 having a side face shape of an inverse L-shape, a trigger 3 hung down from the front part of the jetting apparatus main body 1 in a back and forth movable manner, and a reciprocating pump 4 housed in the inner part of the jetting apparatus main body 1 and operated by the trigger 3, a pair of right and left spring pieces 29 made of a main leaf spring 33 having an approximately arc-like vertical cross-section shape and an auxiliary lead spring 33, which is a leaf spring with an approximately constant load in the vertical cross-section, are hung from both sides of the front part of a horizontal substrate 12 attached to the upper face of the spraying apparatus main body 1, the lower ends of the spring pieces 29 are mechanically joined respectively to the middle parts in both side faces of the trigger 3 to approximately conform the elastic deformation track of the main leaf spring 32 to the arc track having a tangential line in the top wall face of the horizontal substrate.

**LEGAL STATUS**

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**CLAIMS**

**[Claim(s)]**

[Claim 1] A side-face configuration prepares a nozzle at the head of the inverse L-shaped body of a blowout machine, and installs a trigger possible [ longitudinal slide movement ] from the anterior part of the body of a blowout machine. In the trigger type liquid blowout machine which contains the reciprocating pump which operates by this trigger in the interior of the body of a blowout machine, and grows into it From the anterior part both sides of the level substrate attached to the top face of the above-mentioned body of a blowout machine, the spring piece for the plunger double action in a reciprocating pump is installed in one. This spring piece To a plunger, it is located in a nozzle side slack outside, and the longitudinal section is located in the primary plate spring and plunger of an approximate circle arc. It is a return spring made of synthetic resin in the trigger type liquid blowout machine which the back-plate spring with which the longitudinal section constitutes abbreviation constant stress flat spring is combined with one by the upper and lower sides, and is made to agree in general by the radii locus to which the elastic-deformation locus of a primary plate spring has a tangent in the top wall side of said level substrate.

[Claim 2] While the strike which receives the anterior part and the back of a level substrate is formed in the anterior part and the back of the body of a blowout machine on top and the level substrate is sat The return spring made of synthetic resin in the trigger type liquid blowout machine according to claim 1 you made [ machine ] to be engaged to the pocket of a left Uichi pair in which the fitting fixed means was established respectively, the level substrate was fixed and the soffit of each spring piece was prepared between a level substrate and each strike at the both-sides side halfway section of a trigger.

[Claim 3] a nozzle-head member makes the front end of the injection cylinder in the upper part of the above-mentioned body of a blowout machine attach -- having -- \*\*\*\* -- the top face of this nozzle-head member -- the strike of anterior part -- moreover, the return spring made of synthetic resin in the trigger type liquid blowout machine according to claim 2 with which the hind strike is formed in the back top face of a injection cylinder, respectively.

[Claim 4] A nozzle-head member is attached in the front end of the injection cylinder in the upper part of the body of a blowout machine, and this nozzle-head member and the anterior part of a level substrate are formed successively by one. While the strike which receives the back of a level substrate is formed in the back top face of said injection cylinder and the back of a level substrate is sat The return spring made of synthetic resin in the trigger type liquid blowout machine according to claim 1 you made [ machine ] to be engaged to the pocket of a left Uichi pair which the level substrate was fixed and the soffit of each spring piece prepared in the both-sides side halfway section of a trigger with the fitting fixed means between the back of a level substrate, and a hind strike.

[Claim 5] Claim 1 by which the bearing section of a trigger is formed in the continuation section of a back-plate spring and a level substrate, and the bond part of the soffit of a primary plate spring and a back-plate spring is made the engagement section with a trigger, claim 2, the return spring made of synthetic resin in a trigger type liquid blowout machine according to claim 3 or 4.

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[Translation done.]

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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] this invention is \*\* about the return spring made of synthetic resin in a trigger type liquid blowout machine.

[0002]

[Description of the Prior Art] The trigger type liquid blowout machine made of synthetic resin to which the fuel spray, injection, \*\*\*\*, etc. carry out a liquid is already common knowledge. The side-face configuration prepared the nozzle at the head of the inverse L-shaped body of a blowout machine, and installed the trigger possible [ longitudinal slide movement ] from the anterior part of that body of a blowout machine, and this trigger type liquid blowout machine contained the reciprocating pump which operates by this trigger inside that body of a blowout machine, and usually carried out the inner package of the metal coil spring for a return which a trigger is made to \*\*\*\*\* to this reciprocating pump, and has put covering on the outside of that body of a blowout machine. Moreover, it sucks up with a wearing cylinder to the soffit of the body of a blowout machine, and has a pipe, and while equipping the top neck part of the bottle object which held the liquid by this wearing cylinder, he is trying to make a sucking pipe insert into the bottle object. By carrying out a deer, operating a trigger and operating a reciprocating pump, if the liquid in a bottle object is sucked up, the fuel spray, injection, \*\*\*\*, etc. are suitably gushed from a nozzle.

[0003]

[Problem(s) to be Solved by the Invention] It is being tried and put in practical use that re-utilizing with buildup of trash recently, using trash as a resource is called for, and it also makes the spring for a return in a reciprocating pump the product made of synthetic resin. This invention uses the spring for a return in the above-mentioned reciprocating pump as the simple and powerful flat spring made of synthetic resin as part of that. Although various things are already proposed, if a load rate is each part regularity, internal stress will concentrate the flat spring made of synthetic resin near the fixed part, if it turns around the setting-out use count at the time of a design a top, in order for the possibility of fatigue breakage to arise and to aim at in general uniform distribution of internal stress, when continuous change of the spring constant is carried out, the spring elasticity needed is not acquired or problems, such as requiring a big actuation load superfluously, are. For this reason, this invention shares a fixed tangent for the elastic-deformation locus of a primary plate spring. While prevent concentration of internal stress and it enables it to compensate lack of the spring elasticity at the time of a return to the original form with the impact resilience of a semi- constant force spring, and it is soft and making the feel of the actuation into what has the strong waist by considering as the radii locus whose diameter is reduced continuously It is making to make attachment of a return spring and immobilization into an easy and positive thing into the technical problem.

[0004]

[Means for Solving the Problem] Invention of claim 1 prepares a nozzle at the head of the body of a blowout machine inverse L-shaped in a side-face configuration for the above-mentioned object. In the

trigger type liquid blowout machine which installs a trigger possible [ longitudinal slide movement ] from the anterior part of the body of a blowout machine, contains the reciprocating pump which operates by this trigger in the interior of the body of a blowout machine, and grows into it The spring piece for the plunger double action in a reciprocating pump is installed in one from the anterior part both sides of the level substrate attached to the top face of the above-mentioned body of a blowout machine. This spring piece To a plunger, it is located in a nozzle side slack outside, and the longitudinal section is located in the primary plate spring and plunger of an approximate circle arc. The back-plate spring with which the longitudinal section constitutes abbreviation constant stress flat spring is combined with one by the upper and lower sides, and the elastic-deformation locus of a primary plate spring was taken as the configuration of being made to agree in general by the radii locus which has a tangent in the top wall side of said level substrate.

[0005] While considering association between the level substrate of a spring piece on either side, and the top face of the body of a blowout machine as association by the strike and fitting fixed means which were established forward and backward in invention of claim 2, it is made for attachment by the spring piece and the trigger to be completed only by making the soffit of a spring piece engaged to the pocket of a trigger, and carried out as the configuration which can attain easy-izing of assembly operation, and certain-ization of engagement and immobilization.

[0006] In invention of claim 3, it considered as the configuration which can attain easy-izing and speeding up of assembly operation by preparing the \*\*\*\* fixed portion of the level substrate of a spring piece in the top face of the nozzle-head member attached in the front end of a injection cylinder, and the back top face of a injection cylinder.

[0007] In invention of claim 4, it considered as the configuration which can attain promotion of efficiency of the activity by the abbreviation like an erector by fabricating and connecting [ front end / of a injection cylinder ] at one the anterior part of the nozzle-head member and level substrate which are attached.

[0008] In invention of claim 5, it considered as the configuration which can attach a spring piece and a trigger, without spoiling the property of a spring piece member by forming the bearing section of a trigger in the continuation section of a back-plate spring and a level substrate, and making the bond part of the soffit of a primary plate spring and a back-plate spring into the engagement section with a trigger.

[0009]

[Embodiment of the Invention] The drawing shows the gestalt of operation concerning the return spring made of synthetic resin in the trigger type liquid blowout machine which combined and applied each invention of claim 1, claim 2, claim 3, and claim 5. The nozzle with which it sets to drawing and a side-face configuration can switch 1 to the inverse L-shaped body of a blowout machine, the fuel spray which prepared 2 at the head of this body of a blowout machine, injection, and \*\*\*\*, The trigger which installed 3 possible [ longitudinal slide movement ] from the anterior part of the body of a blowout machine, the reciprocating pump with a built-in body of a blowout machine with which, as for 4, a plunger 5 operates by this trigger, and 6 are the return springs made of synthetic resin with which the top face of the body of a blowout machine thru/or the outside of a trigger were equipped. The plunger of a trigger and a reciprocating pump is energized to the front. While the soffit of the body of a blowout machine was equipped with 7 free [ a revolution ], the wearing cylinder of screw-thread \*\*\*\* and 8 are coverings in which it installed from the soffit of the body of a blowout machine by the inside of this wearing cylinder and which put a pipe and 9 on the outside of the body of a blowout machine by sucking up, and these consist of the shaping member by synthetic resin.

[0010] The body 1 of a blowout machine attached the nozzle-head member 11 in the front end of the upside injection cylinder 10 from on [ of synthetic-resin shaping ] expedient, and has equipped with the above-mentioned nozzle 2 at the head of this nozzle-head member. At the anterior part of the top face of the body 1 of a blowout machine, and the back, i.e., the top face of the above-mentioned nozzle-head member 11 and the back top face of the above-mentioned injection cylinder 10 The strikes 13 and 14 which receive the level substrate 12 of the above-mentioned return spring 6 which consists of a synthetic-resin plate manufacturing spring are formed. The strike 13 of anterior part is formed in the top

face of the above-mentioned nozzle-head member 11 from the small level piece 15 attached to one, and the hind strike 14 is formed from the protruding line 16 of the cross direction of two articles which is parallel at spacing larger than the width of face of the level piece 15.

[0011] The return spring 6 belongs to a synthetic-resin plate manufacturing spring, and the level substrate 12 constructed over the strikes 13 and 14 before and behind the above is formed. The anterior part and the back of this level substrate are respectively sat to the strikes 13 and 14 of order. And the level substrate 12 The front end section is formed in the double width corresponding to between the hind strikes 14 16, i.e., the protruding line of two articles, for except [ its ] corresponding to the strike 13 15, i.e., the small level piece, of anterior part by a small margin as what installed ribs 18 and 19 from both the edges of a top wall 17. While making the anterior part and the back of the top wall 17 lay in the above-mentioned level piece 15 and the protruding line 16 of two articles, respectively, fitting of the ribs 18 and 19 of both sides is carried out to each level piece 15 to the outside of the protruding line 16 of two articles. Moreover, at the back of the level substrate 12, the rib 20 of two more articles is installed inside the rib 19 of both the above-mentioned edges on the underside of a top wall 17, and fitting is carried out to the inside of the protruding line 16 of the two above-mentioned articles, respectively.

[0012] Between the strikes 13 and 14 of order, and the level substrate 12 The fitting fixed means 21 and 22 are provided, respectively. The fitting fixed means 21 of anterior part While forming the engagement pawl 23 in the anterior part common-law marriage of the rib 18 of before [ a level substrate ] edge both edges, respectively, and making both the engagement pawl 23 \*\*-arrival-engaged to both the edges of the above-mentioned level piece 15 and drilling the 1st window hole 24 in the anterior part of the level substrate top wall 17 the top-face proper place of the level piece 15 -- the 1st stop pawl 25 -- protruding -- this -- the 1st stop pawl 25 is made to engage with the first transition of the 1st window hole 24, and it changes. Moreover, the hind fitting fixed means 22 protrudes the suppression piece 26 to the front in the back end of the strike 14 of the back from the top face of the body 1 10 of a blowout machine, i.e., the above-mentioned injection cylinder. while drilling the 2nd window hole 27 for the back end section of the level substrate top wall 17 in a presser foot and this suppression piece 26 by this suppression piece 26 -- the top-face proper place of the back end section of the level substrate top wall 17 -- the 2nd stop pawl 28 -- protruding -- this, although the 2nd stop pawl 28 is made to engage with the first transition of the 2nd window hole 27 It is not limited to this engagement structure.

[0013] The fit-in cooperation of the in-and-out sliding is mechanically enabled from the upper part to the upward pocket 31 which installed the spring piece 29 made of the synthetic resin of a left Uichi pair from the anterior part both sides of the level substrate 12, and established the soffit 30 in the both-sides side halfway section of a trigger 3, respectively. The spring piece 29 of a left Uichi pair is formed from the back-plate spring 33 arranged on the primary plate spring 32 arranged on the location before nozzle side slack, respectively, and the after [ plunger slack ] location, and is set to one in the soffit 30. Moreover, the bearing 34 of the left Uichi pair in facing back and forming the crevice of the shape of a C character which carries out opening is formed in the continuation section slack end face section with the level substrate of both the back-plates spring 33, and it installs possible [ longitudinal slide movement ] by pivoting by the cantilever arm 36 which made both the up edge 35 of the shape of dichotomy of a trigger 3 protrude on this bearing at these.

[0014] When carrying out a deer and attaching the level substrate 12 of the return spring 6 to the anterior part of body of blowout machine 1 top face, and the back, i.e., the top face of the nozzle-head member 11 and the back top face of the injection cylinder 10 It inserts in under the hind 22 casks of fitting fixed means suppression piece 26 from on slant a little. first -- the back of the level substrate 12 of the return spring 6 -- \*\* before the body 1 of a blowout machine -- While making the 2nd stop pawl 28 of the level substrate top wall 17 back-end section engaged to the first transition of the 2nd window hole 27 of the suppression piece 26 It is made to sit down to the strike 14 16 of the back of injection cylinder 10 top face, i.e., the protruding line of two articles. Subsequently Depress the level substrate 12, and the anterior part of the level substrate 12 at the same time it sits, the strike 13 15, i.e., the level piece, of anterior part of nozzle-head member 11 top face Each engagement pawl 23 of the rib 18 of before [ a 21 casks of fitting / of anterior part / fixed means level substrate ] edge both edges is made \*\*-arrival-

engaged to both the edges of the level piece 15, and the first transition of the 1st window hole 24 of level substrate top wall 17 anterior part is made engaged to the 1st stop pawl 25 of the level piece 15 top face. What is necessary is just to perform pivoting of the trigger 3 to bearing 34, and engagement to the pocket 31 of the spring piece soffit 30 after that. In addition, the procedure of attachment may not be restricted to this and, of course, they may get mixed up.

[0015] Thus, although the level substrate 12 of the attached return spring 6 will receive the big force from both the springs piece 29 to back and the upper part by lengthening a trigger 3, the top face of the body 1 of a blowout machine is fixed to it stably and powerfully, it functions as a reaction force plate of both the springs piece 29, and makes both the springs piece 29 demonstrate resiliency accurately and powerfully. Therefore, both the springs piece 29 can be made to from-cartridge-energize proper to the front to the plunger 5 of a trigger 3 and a reciprocating pump 4 even if it is a product made of synthetic resin. And since both the springs piece 29 is used as the primary plate spring 32 and the back-plate spring 33, respectively, while the elastic deformation of big bending shown in drawing 15 by lengthening a trigger 3 is produced and bending stress (compressive stress and tensile stress) acts on each, bending stress (tensile stress and compressive stress of a scattered part) will act on these primary plate springs 32 and back-plate springs 33 in the large range which contains a middle clinch part in the back-plate spring 33. Therefore, it can be sticky for the primary plate spring 32 from the back-plate spring 33, it can be made to be able to produce strong elasticity with the strong waist, and the back-plate spring 33 can be made to produce soft repulsion elasticity with much deformation.

[0016] The primary plate spring 32 located in a nozzle 2 side slack outside to a plunger 5 The longitudinal section is made into an approximate circle arc, and the rotation locus slack elastic-deformation locus by reciprocation of a trigger 3 As shown in drawing 2 , drawing 3 , drawing 4 , and drawing 15 , it is made to agree in general by the radii loci Y and Z which have Tangent X in the 17th page of the top wall of the level substrate 12 with which the lateral surface of the primary plate spring 32 is continuing, and both-way elastic deformation of the meantime is carried out. This sake, It distributes uniformly [ abbreviation with the whole primary plate spring 32 ], and internal stress does not concentrate locally the internal stress generated in the primary plate spring 32 at the time of elastic deformation.

[0017] The back-plate spring 33 located in a plunger 5 side is made into the configuration from which the longitudinal section constitutes abbreviation constant stress flat spring. One reverse [ of S characters ]-like flection is formed between the parts in which the back-plate spring 33 of the example of a graphic display follows the vertical ends of the primary plate spring 32. With the structure of the example of a graphic display Even if the crookedness degree of an inverted-L-shaped flection located in the center changes with the elastic deformation of the primary plate spring 32 at the time of a slack liquid blowout gradually at the time of \*\*\*\* While continuing [ from the beginning of the elastic deformation of the back-plate spring 33 ] till a telophase, it is maintained in general by homogeneity, the load, i.e., the press elasticity, transmitted to the primary plate spring 32 side from the ends of the back-plate spring 33.

[0018] Moreover, although bending stress, i.e., internal stress, is distributed by the part containing the point-of-inflection both sides of an inverted-L-shaped flection, it does not concentrate locally and a crookedness degree returns to the original condition gradually at the time of the double action of a trigger 3 since the elastic deformation of the back-plate spring 33 serves as continuous change of a crookedness degree Since it is maintained in general by homogeneity, the load, i.e., the press elasticity, transmitted to the vertical edge of the primary plate spring 32 in the meantime, the elasticity to which the spring piece 29 of a left Uichi pair acts on a plunger 5 in each at the time of double action is held in general uniformly during actuation termination from the early stages of actuation at the time of \*\*\*\* of a trigger 3.

[0019] As abbreviation constant stress flat spring, the back-plate spring 33 of a graphic display example of there being no definition especially in the configuration is natural, although a S character-like meandering spring, a rectangle meandering spring, etc. are desirable.

[0020] As the covering 9 as stated above is shown in drawing 1 and drawing 2 , the engagement

projections 50 and 51 formed in the inner surface While making it engage with the engagement projections 54 and 55 formed in the base 52 and crowning 53 of the body 1 of a blowout machine currently attached to the wearing cylinder 7 as shown in drawing 1 , drawing 2 , and drawing 3 As shown in drawing 2 , it is firmly attached by making the engagement protruding lines 58 and 59 formed in both the outsides of the body 1 of a blowout machine engage with the engagement lateral bracings 56 and 57 formed in the both-sides inner surface of covering 9.

[0021] The trigger 3 is making reciprocation occur in a plunger 5, when the projection 60 by which horizontal-bridging formation was carried out towards the plunger 5 side always engages with the contact crypt 61 at the head of a plunger 5 by the elasticity of the spring piece 29 as shown in drawing 1 , drawing 3 , and drawing 4 .

[0022] Although invention of claim 4 omitted the graphic display, the nozzle-head member 11 shown in drawing 4 and the anterior part of the level substrate 12 carry out connection shaping at one, and it skips the engagement process of the top face of the nozzle-head member 11 and the anterior part of the level substrate 12 in each invention of claim 2 and claim 3.

[0023]

[Effect of the Invention] invention of claim 1 -- a nozzle -- a side -- the primary plate spring located outside -- the longitudinal section, since it is made to agree in general by the radii locus to which it is circular and the elastic-deformation locus has a tangent in the top wall side of a level substrate Even if the internal stress at the time of elastic deformation does not concentrate locally and it turns around the setting-out use count at the time of a design a top, there is effectiveness which can make possibility of fatigue breakage remarkably low, and it also has the effectiveness which can enlarge the degree of freedom of a design of a spring further.

[0024] Moreover, since the back-plate spring is constituted as the longitudinal section constitutes abbreviation constant stress flat spring Since the impact resilience becomes in general fixed irrespective of the size of elastic deformation, can determine the actuation feeling of a trigger only by the spring constant of a primary plate spring in general, and The effectiveness that lack of the spring elasticity of the primary plate spring at the time of trigger double action can be compensated with the impact resilience of a back-plate spring always in general fixed irrespective of the size of an actuation stroke of a trigger is done so. As the result it is effective in the actuation feeling of the trigger which can boil markedly the feeling of actuation of a trigger, a trigger, and the return engine performance of a reciprocating pump, and could raise them, therefore was far superior to the simple metal coil spring being obtained.

[0025] the mounting structure of a primary plate spring and a back-plate spring -- \*\*\*\*\* -- it can consider as what has big reinforcement without things, and the effectiveness which can moreover make the mounting easy is done so. [ as opposed to / according to both invention of claim 2 and claim 3 / the body of a blowout machine ]

[0026] According to invention of claim 4, it is effective in the ability to be shortened like the erector of a trigger type liquid blowout machine by one process, and there is effectiveness which can be made into the structure where the mounting structure of a trigger can be attached easily and where reinforcement is large according to invention of claim 5.

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[Translation done.]



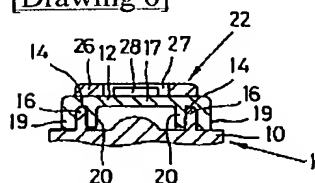
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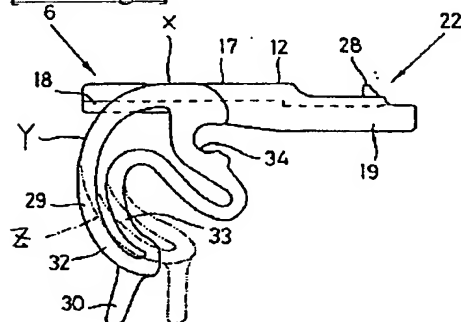
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## DRAWINGS

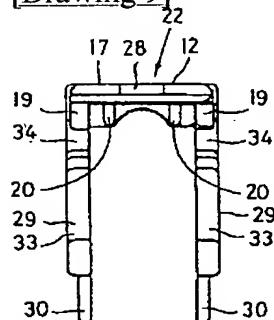
[Drawing 6]



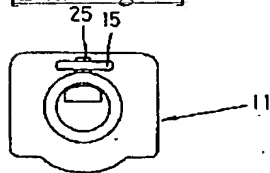
[Drawing 7]



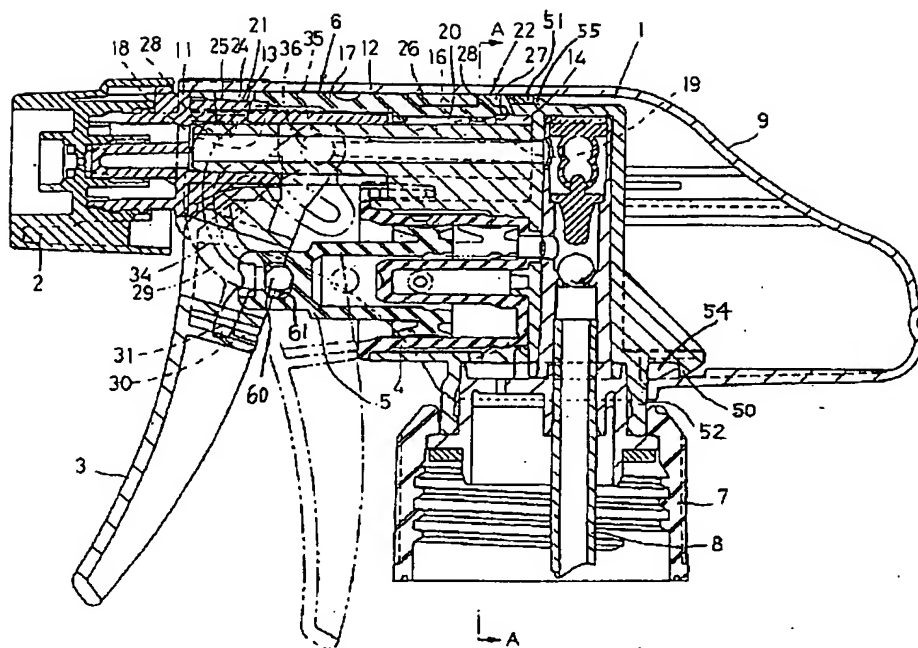
[Drawing 9]



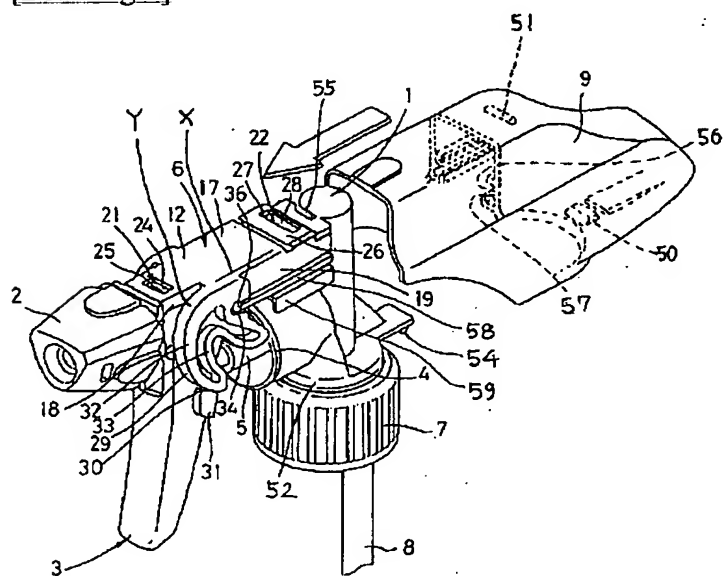
[Drawing 13]



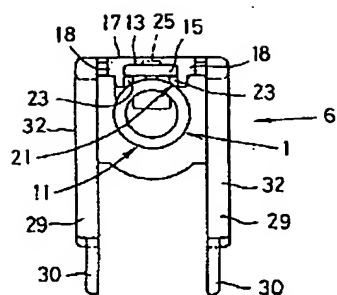
[Drawing 1]



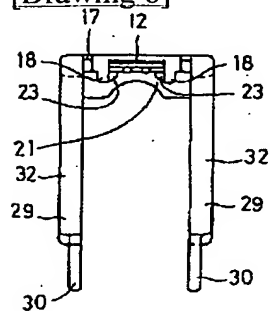
[Drawing 2]



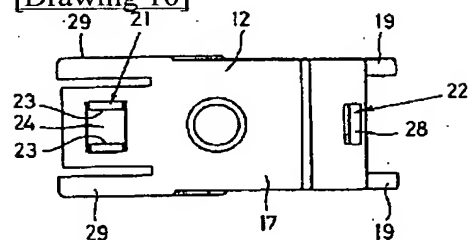
[Drawing 5]



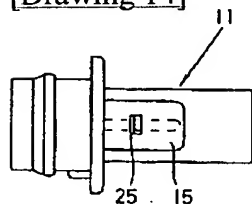
[Drawing 8]



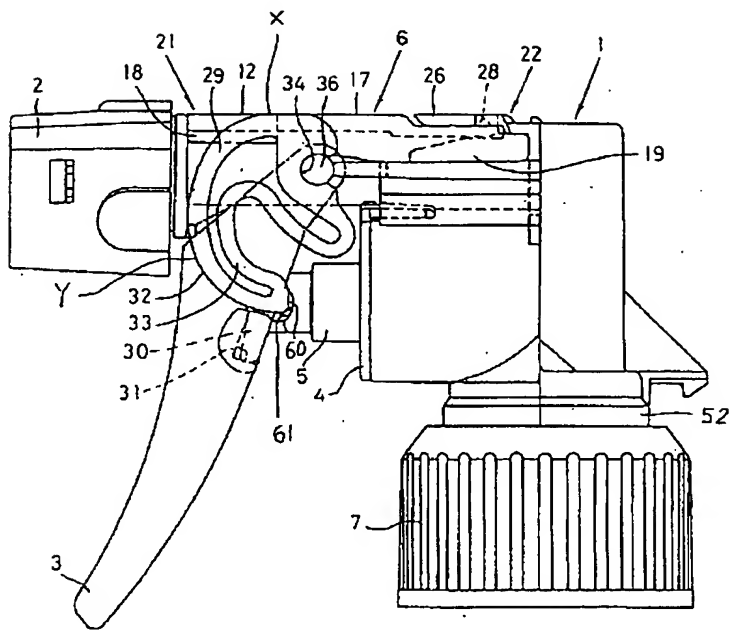
[Drawing 10]



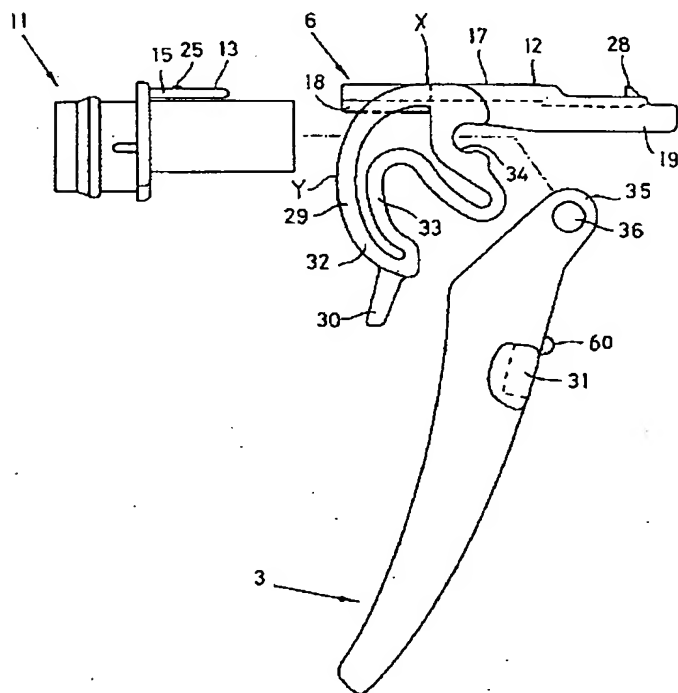
[Drawing 14]



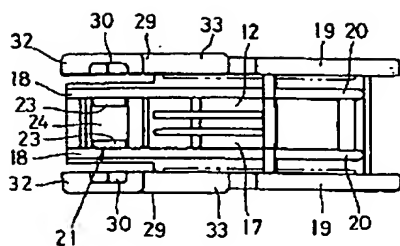
[Drawing 3]



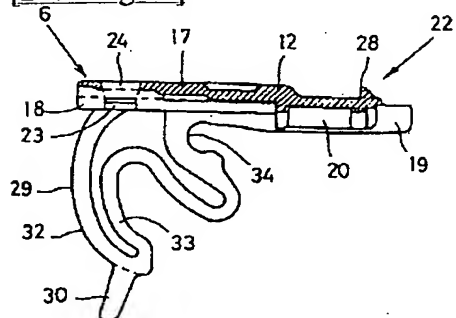
[Drawing 4]



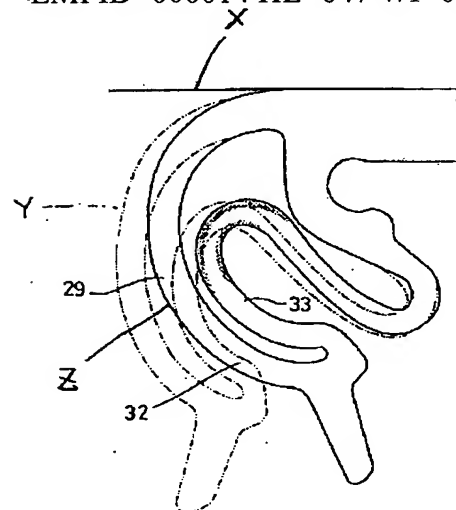
[Drawing 11]



[Drawing 12]



<EMI ID=000014 HE=047 WI=059 LX=1250 LY=1620> [Drawing 15]



[Translation done.]

(19)



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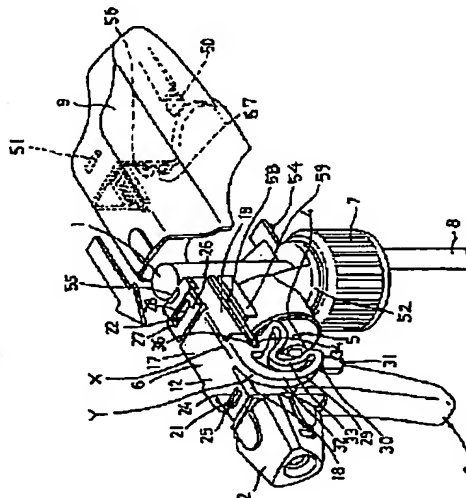
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**PROBLEM TO BE SOLVED:** To simplify a spring and give a soft and good stiffness touch of operation by using a leaf spring made of a synthetic resin with high strength.

**SOLUTION:** In a trigger type liquid jetting apparatus comprising a nozzle 2 installed in the tip end of a jetting apparatus main body 1 having a side face shape of an inverse L-shape, a trigger 3 hung down from the front part of the jetting apparatus main body 1 in a back and forth movable manner, and a reciprocating pump 4 housed in the inner part of the jetting apparatus main body 1 and operated by the trigger 3, a pair of right and left spring pieces 29 made of a main leaf spring 33 having an approximately arc-like vertical cross-section shape and an auxiliary lead spring 33, which is a leaf spring with an approximately constant load in the vertical cross-section, are hung from both sides of the front part of a horizontal substrate 12 attached to the upper face of the spraying apparatus main body 1, the lower ends of the spring pieces 29 are

mechanically joined respectively to the middle parts in both side faces of the trigger 3 to approximately conform the elastic deformation track of the main leaf spring 32 to the arc track having a tangential line in the top wall face of the horizontal substrate.

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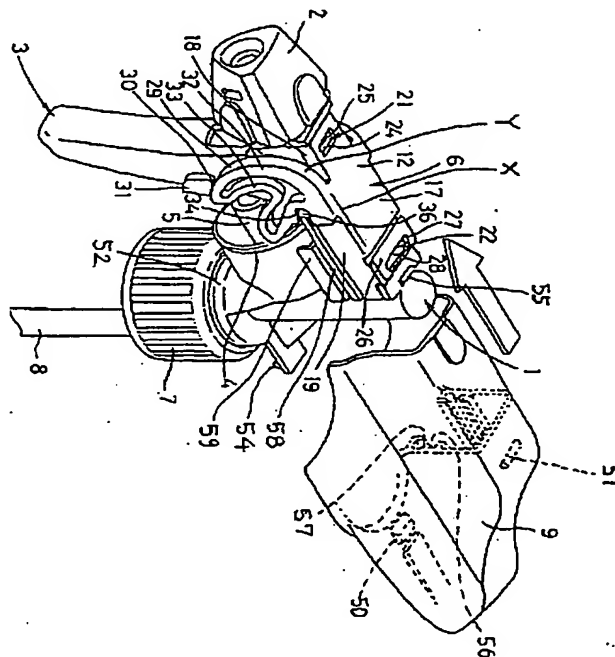
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(54) 【発明の名称】 トリガー式液体噴出器における合成樹脂製復帰ばね

## (57) 【要約】

【課題】 近時、廃棄物の増大に伴って廃棄物を資源として再活用することが求められて来っており、往復ポンプにおける復帰用のスプリングも合成樹脂製とすることが試みられ、実用化されつつある。その一環として、上記スプリングを簡便かつ強力な合成樹脂製の板ばねとすると共に、操作のフィーリングをソフトで腰の強いものにする。

【解決手段】 側面形状が逆L字状の噴出器本体1の先端にノズル2を設け、その噴出器本体1の前部からトリガー3を前後動可能に垂設し、その噴出器本体1の内部に該トリガー3で作動される往復ポンプ4を内蔵して成るトリガー式液体噴出器において、上記噴出器本体1の上面に付設した水平基板12の前部両側から縦断面略円弧形の主板ばね32と縦断面略定荷重板ばねたる副板ばね33で形成した左右一対のばね片29を垂設し、これらのばね片29の下端30をそれぞれ上記トリガー3の両側面中途部へ機械的に連繋させ、主板ばね32の弾性変形軌跡を水平基板の頂壁面内に接線を有する円弧軌跡に概ね合致させた。



## 【特許請求の範囲】

【請求項 1】側面形状が逆し字状の噴出器本体の先端にノズルを設け、その噴出器本体の前部からトリガーを前後動可能に垂設し、その噴出器本体の内部に該トリガーで作動される往復ポンプを内蔵して成るトリガー式液体噴出器において、

上記噴出器本体の上面に付設した水平基板の前部両側から、往復ポンプ内のプランジャ復動用のばね片が一体に垂設され、

該ばね片は、プランジャに対し、ノズル側たる外側に位置し、縦断面が略円弧状の主板ばねと

プランジャ側に位置し、縦断面が略定荷重板ばねを構成する副板ばねとが上下で一体に結合されており、

主板ばねの弾性変形軌跡は、前記水平基板の頂壁面内に接線を有する円弧軌跡に概ね合致させられているトリガー式液体噴出器における合成樹脂製復帰ばね。

【請求項 2】噴出器本体の上面の前部と後部とに水平基板の前部と後部を受ける受座が形成され、水平基板を着座させられているとともに、水平基板と各受座との間に、各々嵌合固定手段が設けられて水平基板が定着させられており、各ばね片の下端がトリガーの両側面中途部に設けられた左右一対のポケットへ係合させられている請求項 1 記載のトリガー式液体噴出器における合成樹脂製復帰ばね。

【請求項 3】上記噴出器本体の上部における、射出筒の前端に筒先部材が嵌着させられており、該筒先部材の上面に前部の受座が、また、射出筒の後部上面に後部の受座がそれぞれ形成されている請求項 2 記載のトリガー式液体噴出器における合成樹脂製復帰ばね。

【請求項 4】噴出器本体の上部における射出筒の前端に筒先部材が嵌着され、該筒先部材と水平基板の前部とが一体に連設されており、前記射出筒の後部上面に水平基板の後部を受ける受座が形成され、水平基板の後部が着座させられているとともに、水平基板の後部と後部の受座との間の嵌合固定手段により、水平基板が定着させられており、各ばね片の下端がトリガーの両側面中途部に設けた左右一対のポケットへ係合させられている請求項 1 記載のトリガー式液体噴出器における合成樹脂製復帰ばね。

【請求項 5】副板ばねと水平基板との連続部にトリガーの軸承部が形成され、主板ばねと副板ばねとの下端の結合部がトリガーとの係合部とされている請求項 1、請求項 2、請求項 3 または請求項 4 記載のトリガー式液体噴出器における合成樹脂製復帰ばね。

## 【発明の詳細な説明】

## 【0001】

【発明の属する技術分野】本発明は、トリガー式液体噴出器における合成樹脂製復帰ばねに関するものである。

## 【0002】

【従来の技術】液体を噴霧、噴射、噴泡等させる合成樹脂製のトリガー式液体噴出器は既に周知である。このトリガー式液体噴出器は、通常、側面形状が逆し字状の噴出器本体の先端にノズルを設け、その噴出器本体の前部からトリガーを前後動可能に垂設し、その噴出器本体の内部に該トリガーで作動される往復ポンプを内蔵し、該往復ポンプにはトリガー共々復帰動させる復帰用の金属製コイルスプリングを内装し、かつ、その噴出器本体の外側にカバーを被着している。また、その噴出器本体の下端に装着筒と吸い上げパイプとを備えて、該装着筒により液体を收容した容器体の口頸部へと装着するとともに、吸い上げパイプをその容器体内へと挿入させるようにしている。しかして、トリガーを操作して往復ポンプを作動させることにより、容器体内の液体を吸い上げてはノズルから噴霧、噴射、噴泡等、適宜に噴出させる。

## 【0003】

【発明が解決しようとする課題】近時、廃棄物の増大に伴って廃棄物を資源として再活用することが求められてきており、往復ポンプにおける復帰用のスプリングも合成樹脂製とすることが試みられ、実用化されつつある。本発明は、その一環として、上記往復ポンプにおける復帰用のスプリングを、簡便かつ強力な合成樹脂製の板ばねとするものである。合成樹脂製の板ばねは既に多種のものが提案されているが、バネ定数を各部一定とすると、固定部近傍に内部応力が集中し、設計時の設定使用回数を上まわると、疲労折損の可能性が生ずるし、内部応力の概ね均一な分散を図るため、バネ定数を連続的に変化させると、必要とされるバネ弾性が得られないとか、あるいは不必要に大きな作動力を要する等の問題がある。このため本発明は、主板ばねの弾性変形軌跡を、一定の接線を共有し、連続的に縮径される円弧軌跡とすることにより内部応力の集中を防ぎ、原形への復帰時のバネ弾性の不足を準定荷重ばねの反発弾性で補いうるようにし、その操作の感触をソフトで腰の強いものにしようとすると共に、復帰ばねの組み付け、固定を容易かつ確実なものとするを課題としている。

## 【0004】

【課題を解決するための手段】上記目的のため、請求項 1 の発明は、側面形状が逆し字状の噴出器本体の先端にノズルを設け、その噴出器本体の前部からトリガーを前後動可能に垂設し、その噴出器本体の内部に該トリガーで作動される往復ポンプを内蔵して成るトリガー式液体噴出器において、上記噴出器本体の上面に付設した水平基板の前部両側から往復ポンプ内のプランジャ復動用のばね片が一体に垂設され、該ばね片は、プランジャに対し、ノズル側たる外側に位置し、縦断面が略円弧状の主板ばねとプランジャ側に位置し、縦断面が略定荷重板ばねを構成する副板ばねとが上下で一体に結合されており、主板ばねの弾性変形軌跡は、前記水平基板の頂壁面内に接線を有する円弧軌跡に概ね合致させられていると



いう構成とした。

【0005】請求項2の発明では、左右のばね片の水平基板と噴出器本体の上面との間の結合を、前後に設けた受座と嵌合固定手段とによる結合とすると共に、ばね片の下端をトリガーのポケットへ係合させるのみでばね片とトリガーとの組み付けが完了するようにし、組立作業の容易化と係合、固定の確実化を図りうる構成とした。

【0006】請求項3の発明では、射出筒の前端に嵌着した筒先部材の上面と、射出筒の後部上面とに、ばね片の水平基板の受支固定部分を設けることにより組立作業の容易化と迅速化とを図りうる構成とした。

【0007】請求項4の発明では、射出筒の前端に嵌着される筒先部材と水平基板の前部とを一体に成形し接続することにより、組立工程の省略による作業の能率化を図りうる構成とした。

【0008】請求項5の発明では、副板ばねと水平基板との連続部に、トリガーの軸承部を形成し、主板ばねと副板ばねとの下端の結合部をトリガーとの係合部とすることにより、ばね片部材の特性を損なうことなく、ばね片とトリガーとを組み付けうる構成とした。

【0009】

【発明の実施の形態】図面は、請求項1、請求項2、請求項3および請求項5の各発明を併せ適用したトリガー式液体噴出器における合成樹脂製復帰ばねに係る実施の形態を示している。図において、1は側面形状が逆L字状の噴出器本体、2は該噴出器本体の先端に設けた噴霧、噴射、噴泡に切り換え得るノズル、3は噴出器本体の前部から前後動可能に垂設したトリガー、4は該トリガーでプランジャ5が作動される噴出器本体内部の往復ポンプ、6は噴出器本体の上面ないしトリガーの外側に装着した合成樹脂製の復帰ばねで、トリガーおよび往復ポンプのプランジャを前方へと付勢している。7は噴出器本体の下端に回転自在に装着した内ねじ螺筒の装着筒、8は該装着筒の内側で噴出器本体の下端から垂設した吸い上げパイプ、9は噴出器本体の外側に被着したカバーであり、これらは合成樹脂による成形部材から成るものである。

【0010】噴出器本体1は、合成樹脂成形の便宜上から上部の射出筒10の前端に筒先部材11を嵌着し、該筒先部材の先端に上記ノズル2を装着している。噴出器本体1の上面の前部と後部すなわち上記筒先部材11の上面と上記射出筒10の後部上面に、合成樹脂製板ばねから成る上記復帰ばね6の水平基板12を受ける受座13、14を形成しており、前部の受座13を上記筒先部材11の上面に一体に付設した小幅の水平片15から形成し、後部の受座14をその水平片15の幅より広い間隔で平行する2条の前後方向の突条16から形成している。

【0011】復帰ばね6は、合成樹脂製板ばねに属するものであり、上記前後の受座13、14に架設する水平

基板12を設けて、該水平基板の前部と後部を各々前後の受座13、14へと着座させ、そして水平基板12は、頂壁17の両縁からリブ18、19を垂設したものとして、前端部を前部の受座13すなわち小幅の水平片15に対応する小幅に、それ以外を後部の受座14すなわち2条の突条16間に対応する広幅に形成して、その頂壁17の前部と後部をそれぞれ上記水平片15と2条の突条16に載置させると共に、両側のリブ18、19をそれぞれの水平片15と2条の突条16の外側へ嵌合させている。また、水平基板12の後部では、頂壁17の下面にて上記両縁のリブ19の内側に更に2条のリブ20を並設してそれぞれ上記2条の突条16の内側へ嵌合させている。

【0012】前後の受座13、14と水平基板12との間には、それぞれ嵌合固定手段21、22を講じており、前部の嵌合固定手段21は、水平基板前端部両縁のリブ18の前部内縁にそれぞれ係合爪23を設けて、両係合爪23を上記水平片15の両縁へ抱合係合させ、かつ、水平基板頂壁17の前部に第1の窓孔24を穿設すると共に、その水平片15の上面適所に第1の係止爪25を突設して、該第1の係止爪25をその第1の窓孔24の前縁に係合させて成る。また、後部の嵌合固定手段22は、その後部の受座14の後端にて噴出器本体1すなわち上記射出筒10の上面から前方へ抑止片26を突設して、該抑止片26により水平基板頂壁17の後端部を押え、かつ該抑止片26に第2の窓孔27を穿設すると共に、水平基板頂壁17の後端部の上面適所に第2の係止爪28を突設して、該第2の係止爪28をその第2の窓孔27の前縁に係合させているが、かかる係合構造に限定されるものではない。

【0013】水平基板12の前部両側からは、左右一対の合成樹脂製のばね片29を垂設してそれぞれ下端30をトリガー3の両側面中途部に設けた上向きのポケット31へ機械的に上方から出入摺動自在に嵌挿連繋させており、左右一対のばね片29は、それぞれノズル側たる前位置に配した主板ばね32とプランジャ側たる後位置に配した副板ばね33から形成し、下端30で一つにしている。また、両副板ばね33の水平基板との連続部たる基端部には、後方に面して開口するC字状の凹部を形成することで左右一対の軸受34を設けており、該軸受にトリガー3の二又状の両上端部35をこれらに突設させた片持部36にて枢着することで前後動可能に垂設している。

【0014】しかして、復帰ばね6の水平基板12を噴出器本体1上面の前部と後部すなわち筒先部材11の上面と射出筒10の後部上面に組み付けるときは、まず復帰ばね6の水平基板12の後部を、その噴出器本体1の前方やや斜め上から後部の嵌合固定手段22たる抑止片26の下へ差し込んで、水平基板頂壁17後端部の第2の係止爪28をその抑止片26の第2の窓孔27の前縁

へ係合させると共に、射出筒10上面の後部の受座14すなわち2条の突条16へと着座させ、次いで、その水平基板12を押し下げて、水平基板12の前部を、筒先部材11上面の前部の受座13すなわち水平片15に着座させると同時に、前部の嵌合固定手段21たる水平基板前端部両縁のリップ18の各係合爪23をその水平片15の両縁へ抱着係合させ、かつ、水平基板頂壁17前部の第1の窓孔24の前縁をその水平片15上面の第1の係止爪25へと係合させる。軸受34へのトリガー3の枢着およびばね片下端30のポケット31への係合は、その後に行えばよい。なお、組み付けの手順はこれに限るものではなく、それらが前後してもよいことは勿論である。

【0015】このように組み付けられた復帰ばね6の水平基板12は、トリガー3が引かれることにより両ばね片29から後方および上方へ大きな力を受けることとなるが、噴出器本体1の上面に安定かつ強力に定着されて、両ばね片29の反力板として機能し、両ばね片29に適確かつ強力に弾発力を発揮させる。したがって、両ばね片29には、合成樹脂製ではあってもトリガー3および往復ポンプ4のプランジャ5に対し前方へと適正に弾発付勢させることができる。そして、両ばね片29をそれぞれ主板ばね32と副板ばね33としているので、これらの主板ばね32と副板ばね33には、トリガー3を引くことで図15に示す大きな曲げの弾性変形を生じ、それぞれに曲げ応力（圧縮応力・引張応力）が作用すると共に、副板ばね33において中間の折り返し部分を含む広い範囲に曲げ応力（点々部分の引張応力と圧縮応力）が作用することとなる。従って、主板ばね32には、副板ばね33からねばり強く腰の強い弾力を生じさせることができ、副板ばね33には、変形量の多いソフトな反発弾力を生じさせることができる。

【0016】プランジャ5に対し、ノズル2側たる外側に位置する主板ばね32は、縦断面が略円弧状とされ、トリガー3の往復動による回動軌跡たる弾性変形軌跡は、図2、図3、図4および図15に示されるごとく、主板ばね32の外側面が連続している水平基板12の頂壁17面内に接線Xを有する円弧軌跡Y、Zに概ね合致させられ、その間を往復弾性変形させられており、このため、弾性変形時に主板ばね32内に発生する内部応力は、主板ばね32の全体に略均等に分散され、内部応力が局部的に集中することがない。

【0017】プランジャ5側に位置する副板ばね33は縦断面が略定荷重板ばねを構成する形状とされている。図示例の副板ばね33は、主板ばね32の上下両端に連続する部分の間に、1個の逆S字状屈曲部が形成されており、図示例の構造では、往動時たる液体噴出時の主板ばね32の弾性変形により、中央に位置する逆U字状屈曲部の屈曲度合が徐々に変化しても、副板ばね33の両端から主板ばね32側に伝達される荷重すなわち押圧弾

性は、副板ばね33の弾性変形の当初から終期に至る間において概ね均一に維持される。

【0018】また副板ばね33の弾性変形は、屈曲度合の連続的変化となるので、曲げ応力すなわち内部応力は、逆U字状屈曲部の変曲点両側を含む部分に分散され、局部的に集中することがなく、トリガー3の復動時には屈曲度合が徐々に元の状態に戻るが、その間の主板ばね32の上下端に伝達される荷重すなわち押圧弾性は、概ね均一に維持されるのでトリガー3の往動時、復動時のそれぞれにおいて、左右一対のばね片29がプランジャ5に作用する弾力は、作動初期から作動終了の間概ね一定に保持される。

【0019】図示実施例の副板ばね33は、略定荷重板ばねとして、S字状蛇行ばね、矩形蛇行ばね等が好ましいが、特にその形状には限定がないことは勿論である。

【0020】既述のカバー9は、図1および図2に示されるごとく、その内面に形成された係合突起50、51を、図1、図2および図3に示されるごとく、装着筒7へ嵌着されている噴出器本体1の基部52と頂部53とに形成された係合突起54、55に係合させると共に、図2に示されるごとく、カバー9の両側内面に形成された係合横溝56、57に、噴出器本体1の両外側に形成された係合突条58、59に係合させることにより強固に取り付けられる。

【0021】トリガー3は、図1、図3および図4に示されるごとく、プランジャ5側に向け横架形成された突起60が、ばね片29の弾力により、常時プランジャ5の先端の当接凹窩61に係合することにより、プランジャ5に往復動を生起させている。

【0022】請求項4の発明は、図示を省略したが、図4に示される筒先部材11と水平基板12の前部とが一体に連結成形したものであり、請求項2、請求項3の各発明における筒先部材11の上面と水平基板12の前部との係合工程を省略したものである。

【0023】

【発明の効果】請求項1の発明では、ノズル側たる外側に位置する主板ばねが縦断面円弧状であり、その弾性変形軌跡が、水平基板の頂壁面内に接線を有する円弧軌跡に概ね合致させられているので、弾性変形時の内部応力が局部的に集中することがなく、設計時の設定使用回数を上まわっても疲労折損の可能性を著しく低くしうる効果があり、更にはばねの設計の自由度を大きくしうる効果も有している。

【0024】また副板ばねは、縦断面が略定荷重板ばねを構成するように構成されているので、弾性変形量の大小に拘らず、その反発弾性が概ね一定となるのでトリガーの操作フィーリングを概ね主板ばねのバネ常数のみで決定できるし、トリガー復動時の主板ばねのバネ弾性の不足を、トリガーの作動ストロークの大小に拘らず、常に概ね一定の副板ばねの反発弾性で補いうる効果を奏

し、その結果として、トリガーの操作のフィーリングとトリガーおよび往復ポンプの復帰性能を格段に向上させることができ、従って、単純な金属製コイルスプリングよりもはるかに優れたトリガーの操作フィーリングが得られる効果がある。

【0025】請求項2および請求項3の両発明によると、噴出器本体に対する主板ばねと副板ばねとの取付構造を高めることのない強度の大きなものとすることができ、しかもその取付作業を容易なものとする効果を奏する。

【0026】請求項4の発明によると、トリガー式液体噴出器の組立工程を1工程短縮できる効果があり、請求項5の発明によると、トリガーの取付構造を簡単に取り付けうる強度の大きい構造とする効果がある。

#### 【図面の簡単な説明】

【図1】 請求項1ないし請求項3および請求項5の発明に係る実施の形態を示す縦断側面図である。

【図2】 同実施の形態におけるカバーを取り外した側面図である。

【図3】 同実施の形態におけるカバーを分離させた分解斜視図である。

【図4】 同実施の形態における主要3部材の分解側面図である。

【図5】 図4に示す主要3部材のうちの2部材の組立正面図である。

【図6】 図1 A-A線要部の断面図である。

【図7】 図4に示す主要3部材のうちの一の部材の側面図である。

【図8】 同部材の正面図である。

【図9】 同部材の背面図である。

【図10】 同部材の平面図である。

【図11】 同部材の底面図である。

【図12】 同部材の中央縦断側面図である。

【図13】 図4に示す主要3部材のうちの他の一の部材の正面図である。

【図14】 同部材の平面図である。

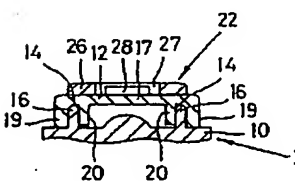
【図15】 ばね片の動作状態を示す説明側面図である。

る。

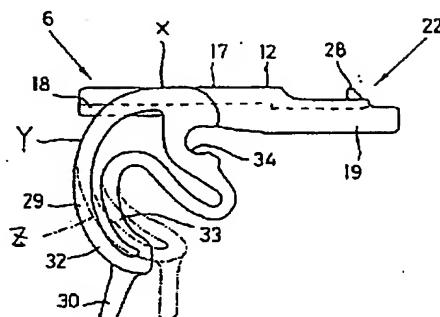
#### 【符号の説明】

- 1 噴出器本体
- 2 ノズル
- 3 トリガー
- 4 往復ポンプ
- 5 プランジャ
- 6 復帰ばね
- 7 装着筒
- 10 8 吸い上げパイプ
- 9 カバー
- 10 射出筒
- 11 筒先部材
- 12 水平基板
- 13, 14 受座
- 15 水平片
- 16 突条
- 17 頂壁
- 18, 19, 20 リブ
- 21, 22 嵌合固定手段
- 23 係合爪
- 24 第1の窓孔
- 25 第1の係止爪
- 26 抑止片
- 27 第2の窓孔
- 28 第2の係止爪
- 29 ばね片
- 30 下端
- 31 ポケット
- 30 32 主板ばね
- 33 副板ばね
- 34 軸受
- 35 上端部
- 36 片持軸
- X 接線
- Y, Z 円弧軌跡

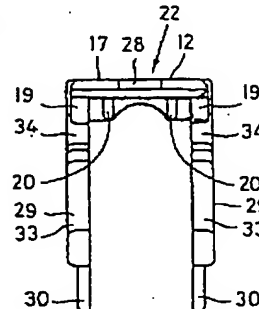
【図6】



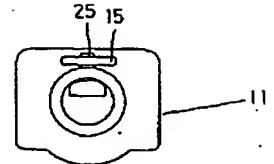
【図7】



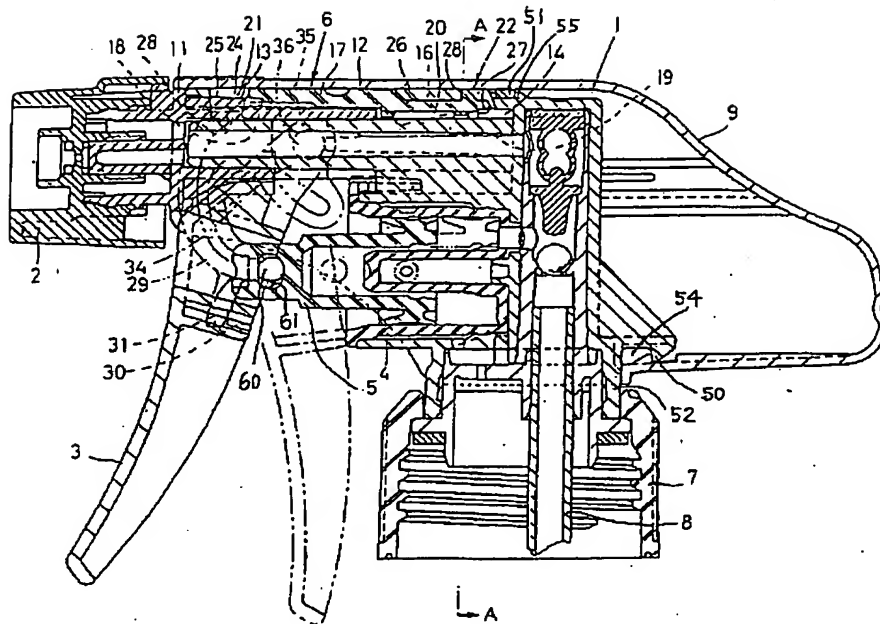
【図9】



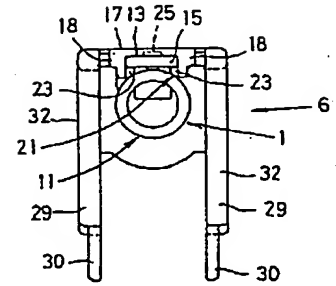
【図13】



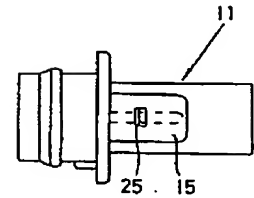
【図 1】



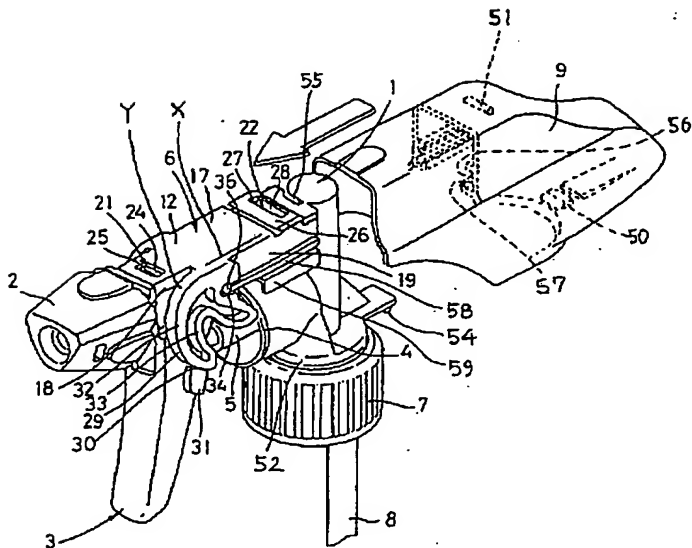
【図 5】



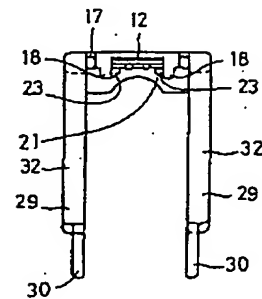
【図 14】



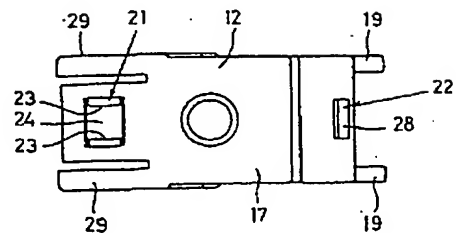
【図 2】



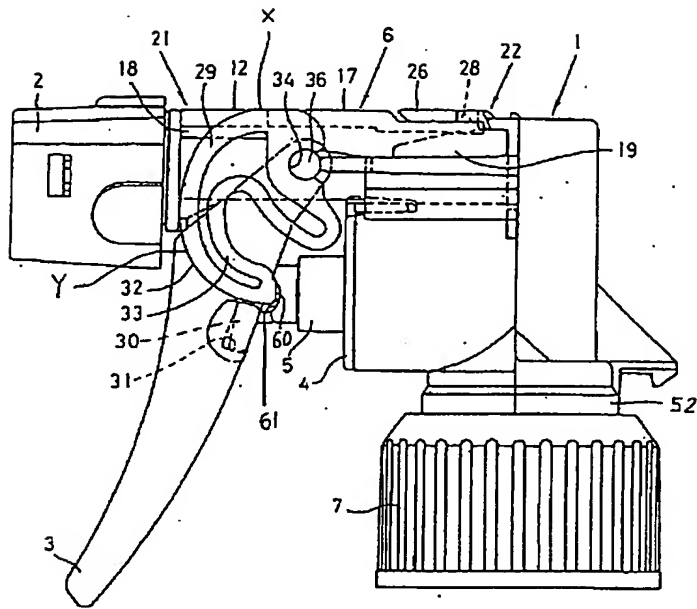
【図 8】



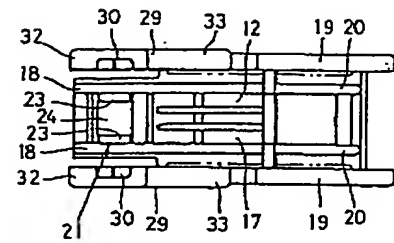
【図 10】



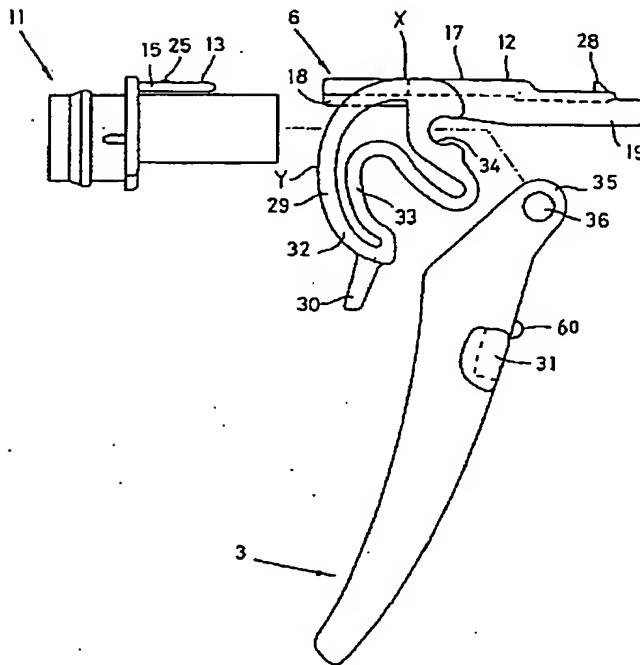
【図 3】



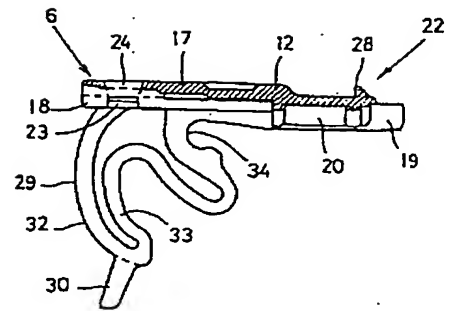
【図 1 1】



【図 4】



【図 1 2】



【図 15】

